

## WHAT IS CLAIMED IS:

1. A compound comprising a plurality of linked nucleosides, wherein:

each nucleoside includes a ~~ribofuranosyl~~ <sup>pentofuranosyl</sup> sugar portion and a base portion; and

at least one of said nucleosides bears at a 2'-O-position, a 3'-O-position, or a 5'-O-position a substituent having formula:



where:

$R_A$  is alkyl having from 1 to about 10 carbon atoms or  $(CH_2-CH_2-Q)_x$ ;

$R_{1a}$  and  $R_{1b}$ , independently, are H,  $R_2$ , or an amine protecting group or have formula  $C(X)-R_2$ ,  $C(X)-R_A-R_2$ ,  $C(X)-Q-R_A-R_2$ ,  $C(X)-Q-R_2$ ; and

$R_2$  is a steroid molecule, a reporter molecule, a lipophilic molecule, a reporter enzyme, a peptide, a protein, or has formula  $-Q-(CH_2CH_2-Q)_x-R_3$ ;

$X$  is O or S;

each  $Q$  is, independently, is NH, O, or S;

$x$  is 1 to about 200;

$R_3$  is H,  $R_A$ ,  $C(O)OH$ ,  $C(O)OR_A$ ,  $C(O)R_4$ ,  $R_A-N_3$ , or  $R_A-NH_2$ ;

$R_4$  is Cl, Br, I,  $SO_2R_5$  or has structure:



$m$  is 2 to 7; and

$R_5$  alkyl having 1 to about 10 carbon atoms.

2. The compound of claim 1 wherein more than one of said nucleosides bear said substituent at a 2'-O-position, a 3'-O-position, or a 5'-O-position.

3. The compound of claim 1 wherein  $R_A$  is  $(CH_2)_n$  where  $n$  is an integer from 1 to about 10.

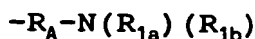
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4. The compound of claim 3 wherein  $n$  is 6.
5. The compound of claim 1 wherein said  $R_{1a}$  and  $R_{1b}$ , together, are phthalimido.
6. The compound of claim 1 wherein  $R_{1a}$  is H and  $R_{1b}$  is  $C(O)-(CH_2)_n-R_2$  where  $n$  is an integer from 1 to about 10.
7. The compound of claim 1 wherein  $R_{1a}$  is H and  $R_{1b}$  is  $R_2$ .
8. The compound of claim 1 wherein  $R_{1a}$  is H and  $R_{1b}$  is  $C(O)-O-R_2$ .
9. The compound of claim 1 wherein  $R_{1a}$  and  $R_{1b}$  both are alkyl.
10. The compound of claim 1 wherein  $R_{1a}$  is H and  $R_{1b}$  is  $C(O)-(CH_2)_n-R_2$  where  $n$  is an integer from 1 to about 10.
11. The compound of claim 10 wherein  $R_2$  has formula  $-(CH_2)_5-NH-$ .
12. The compound of claim 1 wherein  $R_{1a}$  is H and  $R_{1b}$  is  $C(S)-NH-R_2$ .
13. The compound of claim 1 wherein  $R_2$  includes pyrene, fluorescein, dinitrophenyl, cholesterol, acridine.
14. The compound of claim 1 wherein  $R_{1a}$  is H and  $R_{1b}$  is  $C(O)-R_2$ .
15. The compound of claim 14 wherein  $R_2$  has formula  $-O-(CH_2CH_2-O-)_x-R_3$ .

16. A nucleoside comprising a <sup>pentofuranosyl</sup>~~ribofuranosyl~~ sugar portion and a base portion, wherein said nucleoside bears at a 2'-O-position, a 3'-O-position, or a 5'-O-position a substituent having <sup>the</sup> formula:



where:

$R_A$  is alkyl having from 1 to about 10 carbon atoms;

$R_{1a}$  and  $R_{1b}$ , independently, are H,  $R_2$ , or an amine protecting group or have formula  $C(X)-R_2$ ,  $C(X)-R_A-R_2$ ,  $C(X)-Q-R_A-R_2$ ,  $C(X)-Q-R_2$ ; and

$R_2$  is a steroid molecule, a reporter molecule, a lipophilic molecule, a reporter enzyme, a peptide, a protein, or has formula  $-Q-(CH_2CH_2-Q)_x-R_3$ ;

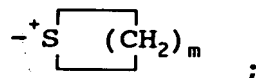
X is O or S;

each Q is, independently, is NH, O, or S;

x is 1 to about 200;

$R_3$  is H,  $R_A$ ,  $C(O)OH$ ,  $C(O)OR_A$ ,  $C(O)R_4$ ,  $R_A-N_3$ , or  $R_A-NH_2$ ; and

$R_4$  is Cl, Br, I,  $SO_2R_5$  or has structure:



m is 2 to 7; and

$R_5$  alkyl having 1 to about 10 carbon atoms.

17. The <sup>nucleoside</sup>~~compound~~ of claim 16 wherein  $R_A$  is  $(CH_2)_n$  where n is an integer from 1 to about 10.

18. The <sup>nucleoside</sup>~~compound~~ of claim 16 wherein n is 6.

19. The <sup>nucleoside</sup>~~compound~~ of claim 16 wherein said  $R_{1a}$  and  $R_{1b}$ , together, are phthalimido.

20. The <sup>nucleoside</sup>~~compound~~ of claim 16 wherein  $R_{1a}$  is H and  $R_{1b}$  is  $C(O)-(CH_2)_n-R_2$  where n is an integer from 1 to about 10.

c 21. The <sup>nucleoside</sup>~~compound~~ of claim 16 wherein  $R_{1a}$  is H and  $R_{1b}$  is  $R_2$ .

c 22. The <sup>nucleoside</sup>~~compound~~ of claim 16 wherein  $R_{1a}$  is H and  $R_{1b}$  is  $C(O)-O-R_2$ .

c 23. The <sup>nucleoside</sup>~~compound~~ of claim 16 wherein  $R_{1a}$  and  $R_{1b}$  both are alkyl.

c 24. The <sup>nucleoside</sup>~~compound~~ of claim 16 wherein  $R_{1a}$  is H and  $R_{1b}$  is  $C(O)-(CH_2)_n-R_2$  where n is an integer from 1 to about 10.

c 25. The <sup>nucleoside</sup>~~compound~~ of claim 24 wherein  $R_2$  has formula  $-(CH_2)_5-NH-$ .

c 26. The <sup>nucleoside</sup>~~compound~~ of claim 16 wherein  $R_{1a}$  is H and  $R_{1b}$  is  $C(S)-NH-R_2$ .

c 27. The <sup>nucleoside</sup>~~compound~~ of claim 16 wherein  $R_2$  includes pyrene, fluorescein, dinitrophenyl, cholesterol, acridine.

c 28. The <sup>nucleoside</sup>~~compound~~ of claim 16 wherein  $R_{1a}$  is H and  $R_{1b}$  is  $C(O)-R_2$ .

c 29. The <sup>nucleoside</sup>~~compound~~ of claim 28 wherein  $R_2$  has formula  $-O-(CH_2CH_2-O-)_x-R_3$ .

30. A method for modulating the production of a protein by an organism comprising contacting an organism with a compound of claim 1.

31. A method for modulating the production of a protein by an organism comprising contacting an organism with a compound of claim 16.

32. A method of treating an animal having a disease characterized by undesired production of protein comprising contacting said animal with a compound of claim 1.

33. A method of treating an animal having a disease characterized by undesired production of protein comprising contacting said animal with a compound of claim 16.

34. A method for detecting the presence or absence of an RNA in a biological sample suspected of containing said RNA comprising contacting said sample with a compound of claim 1.

35. A method for detecting the presence or absence of an RNA in a biological sample suspected of containing said RNA comprising contacting said sample with a compound of claim 16.